OPEN ACCESS JOURNALS
Indiana Journal of Agriculture and Life Sciences
Abbriviate Tittle- Ind J Agri Life Sci
ISSN *(Online)*- 2583-1623
Journal Homepage Link- https://indianapublications.com/journal/IJALS
DOI- 10.5281/zenodo.7386109

INDIANA PUBLICATIONS
PRODUCTIVE AND QUALITY RESEARCH

Research Article

Volume-02|Issue-06|2022

Sheep Production Systems and Breeding Practices in Badghis Province

Abdul Momin AZIMI*[1], Sayed Aalam ANWARI[1], & Abdul Baes KEYHANI[3]

[1]Department of Animal Sciences, Faculty of Agriculture, Badghis Higher Education, Badghis. Afghanistan.
[2]Department of Forestry and Neutral, Faculty of Agriculture, Badghis Higher Education, Badghis. Afghanistan

Article History
Received: 10.11.2022
Accepted: 17.11.2022
Published:20.11.2022

Citation
AZIMI, A. M., ANWARI, S. A., & KEYHANI, A. B. (2022). Sheep Production Systems and Breeding Practices in Badghis Province. *Indiana Journal of Agriculture and Life Sciences*, *2*(6), 13-20.

Abstract: This study conducted to identify the production system, breeding practices and major production of sheep in 16 rural of six districts in Badghis province. A total of 480 households (30 households for each rural) were selected purposively to collect data through personal observations and a detailed structured questionnaire. Mixed crop-livestock production system was the dominant farming system in all the study districts. The farmers kept a variety of livestock species including sheep, goats, cattle, chickens, horse, donkeys and bee colony. Sheep, principally as source of income, meat for home consumption, production of manure and for socio cultural purposes, commonly herded with other species in the open grazing fields by young boys in a family. Mating was generally uncontrolled. Body size, growth rate and adaptability were the major traits in selecting rams, whereas ewes were selected based on body size, twining ability and lambing interval. Majority of sheep across all districts are housed in structures known as *stable* which is built from stone and mud wall. The major constraints hampering sheep production in the study areas were feed shortage (0.25), lack of capital (0.24), insufficient veterinary services (0.2), limited grazing land (0.2), water scarcity (0.06) and predators (0.05) with index value indicated in parenthesis. In order to improve the productivity of sheep, it is important to involve farmers and other stockholders in addressing these constraints and designing breed improvement interventions, considering the overall farming and breeding practice of smallholders.

Keywords: Husbandry Practice, production constraints, sheep production system, Badghis province.

Copyright © 2022 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (**CC BY-NC 4.0**).

INTRODUCTION

The demand for livestock products are increasing as a result of increased human population and relative growth in income. Hence, sustainability of livestock production is important to ensure continuous and sufficient availability of livestock products for the current and future generations. Badghis has different livestock species and breeds that are associated with the diverse agro-ecology of the province. Sheep is among the most important livestock species and dominantly found in the crop-livestock production system. Recent statistics show the presence of 0.3 million heads of sheep in province (Central, 2017) At the farm level, sheep contribute up to 63 percent of the net cash income derived from livestock production in the mixed farming system (Mourad *et al.*, 2008). The rural part of the province is among the areas where smallholder farmers widely practice subsistence sheep production. Overall the productivity of the sheep as measured by off take and size of animals available for market is low. Improving the sheep productivity through improved management and breeding is required as this is crucial for both food security and sustainable development of small holder farmers.

Assessing the production system, indigenous knowledge of selection, management, identification of breeding goals, describing morphological characters and productivity level of the breed in their habitat are prerequisites to set up improvement programs at the smallholder and pastoral levels (Kosgey *et al.*, 2013). The objectives of this study were, therefore, to characterize the existing sheep production systems and breeding practice, and to identify major constraints that limit productivity of common Badghis areas sheep.

MATERIALS AND METHODS

Description of the Study Areas

The study was conducted in six districts belonging to all areas of Badghis province. The districts include Qadis, Abcamari, Bala Murghab, Muqur, Jawand, Qormach (Figure 1), which were purposively selected based on the availability of common Badghis highland sheep and accessibility. The farming system in all of the selected districts is characterized by crop livestock mixed farming system. The major crops grown in the lower altitude areas are sorghum, Maize while wheat, beans, barley, pea, lentil, and grass pea, rarely linseed and other highland crops are common in the mid and highland areas.

Sampling Techniques and Data Collection

All rural villages were selected purposively while households to be interviewed from each of were randomly selected among the common highland sheep owners. Discussions were made with key informants such as farmers' representatives/elders and livestock experts in the Bureau of agriculture and rural development. Data pertaining to common Badghis highland sheep were collected through a household survey. A total of 480 household heads (30 per rural) were randomly selected and interviewed using structured

***Corresponding Author:** Abdul Momin AZIMI

questionnaires developed from previous researcher (Workneh *et al.*, 2004). Before conducting the formal survey, the questionnaire was pre tested and modified to match with the study area's livestock production system and for its appropriateness. The survey was carried out by enumerators under close supervision and participation of the researcher. From the field survey, information on general household characteristics, purposes of keeping sheep, common Badghis highland sheep flock structure, breeding system and selection criteria, disposal and acquisition of sheep were gathered and documented as per the questionnaires developed and pre-tested. The discussion made with the key informants were focused on collecting data pertaining to the production system and potential breeding tract of the common Badghis highland sheep breed.

Data Analysis

Statistical Package for Graph Pad Prism Version 7 (Trial) software was used to analyze the survey data (household information, sheep husbandry and diseases management practice, feeding practice, purpose of sheep keeping, production constraints, selection criteria, acquiring and disposal of sheep), while data for land holding per-household, flock structure and reproductive performances were subjected to analysis of variance (ANOVA) using the general linear model procedure of SAS version 9.2 (2008). Tests of statistical significance or otherwise of particular mean comparisons were done with Duncan's multiple range test. Indices were calculated for all ranking data using the formula: Index = Σ [3 for rank 1 + 2 for rank 2 + 1 for rank 3] given for an individual reason divided by Σ [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for all reasons where indices represent weighted averages of all rankings for a particular trait or reason.

RESULTS AND DISCUSSION

Household Information

Mixed crop-livestock production system is the dominant farming system in the study areas. Livestock production is subsistence-oriented and it is a traditional type which is characterized by minimal inputs like in the other parts of Afghanistan. It was demonstrated that low input production system is found in all livestock production systems prevailing in the country except in pre-urban and urban system (Gebrehiwot *et al.*, 2013). Table 1 presents some key characteristics of the respondents across the study districts. The overall average age of the household head was 48.33 ± 9.16 years, implying that the respondents were adults with a good experience in.

Table 1. Background characteristics of the respondents in the study areas.

Descriptor variables	Districts (Mean± SD)						Overall mean N = 480
	Qadis N = 60	Abcamari N = 60	Muqur N = 60	Jawand N = 60	Murghab N = 60	Qormach N= 60	
Age (years)	47.5 ± 10.3	46.9 ± 8.1	47.2 ± 8.85	48.6 ± 7.4	51.4 ± 9.1	48.7 ± 6.7	48.3 ± 9.2
Family size	7.6 ± 3.5	5.1 ± 1.7	6.2 ± 2.4	7.1 ± 2.6	6.7 ± 2.4	6.3 ± 2.7	6.5 ± 2.7
Sex (in Percent)							
Male	71.7	81.7	70.0	78.3	75.0	75.0	75.0
Female	28.3	18.3	30.0	21.7	25.0	25.0	25.0
Educational Level (in Percent)							
Illiterate	45.0	30.0	30.0	38.3	30.0	16.7	32.6
Read & write	41.6	53.3	46.7	46.7	55.0	60.0	51.3
G 1 – 8	-	10.0	15.0	6.7	6.7	11.3	7.3
G 9 - 10	6.7	3.3	5.0	5.0	5.0	3.3	4.4
G 11 - 12	6.7	3.3	3.3	3.3	3.3	8.3	4.4
Total	100.0	100.0	100.0	100.0		100.0	100.0

G = Grade; N = Number of interviewed households; SD = Standard Deviation.

The overall mean family size was 6.49 ± 2.65, which is comparable with the estimation of 6.4 persons per household reported in other area (Weldeyesus *et al.*, 2016). Among the total household heads, 75.0% were males, which is comparable to the result reported by earlier researchers (Central Statistics, 2017).

This variation could be due to the distance to the urban centers, since education facilities in such areas are likely better for offering chance to the residents to educate themselves and their children. The presence of better educational background in this study would be a good opportunity for enhancing animal genetic improvement programs in the study areas, since literate communities are more likely better to adopt and practice new technologies and also to keep performances records of animals. The present findings indicate that sheep farming is performed by every social class of the community regardless of their background

***Corresponding Author:** Abdul Momin AZIMI

characteristics and show the significant importance of sheep to the producers.

Land Holding and Farm Activities

The overall average landholding per household in the study areas was 1.0 ± 0.8 hectare (Table 2). There is significant (P < 0.05) difference between the districts. Qadis, Abcamari and Muqur area districts have larger land holding while households in Bala Murghab, Jawand and Qormach, have smaller landholding with no significant difference in land size among these districts. This result shows that the average land holding size per household in the mid altitude was higher than high altitude due to the dense population in the later. Almost all respondents across the study areas indicated that the trend of land holding size per household is decreasing over time. Human population growth rate, expansion of the existing town and newly established town, establishment of governmental institutes, land degradation and soil erosion are some of the mentioned factors contributing to the declining landholding per house hold across all districts. The average landholding reported in this study was greater than 0.2 ± 0.3 hectare reported (Weldeyesus *et al.*, 2016).

Livestock Holding and Flock Structures

Table 2. Small holder land holding and flock structure of the study areas (Mean ± SD).

Descriptors	Districts						Test
	Qadis N = 60	Abcamari N= 60	Bala Murghab N = 60	Muqur N = 60	Jawand N = 60	Qormach N = 60	P value
Average land size/household (ha)	2.1 ± 1.1^{a}	0.7 ± 0.4^{d}	0.7 ± 0.5^{d}	1.4 ± 0.8^{b}	0.7 ± 0.4^{d}	1.0 ± 0.8^{c}	P < 0001
Livestock							
Ram	1.9 ± 0.8^{a}	0.9 ± 0.6^{c}	1.1 ± 0.5^{c}	1.4 ± 0.6^{b}	1.1 ± 0.9^{c}	1.8 ± 1.1^{a}	P < 0.001
Ewe	9.0 ± 2.8^{a}	6.8 ± 1.9^{cd}	5.5 ± 1.7^{e}	7.6 ± 3.5^{bc}	6.3 ± 1.8^{de}	8.7 ± 2.8^{a}	P < 0.001
Ram lamb	2.6 ± 1.0^{b}	2.2 ± 0.8^{bc}	1.9 ± 0.8^{c}	2.6 ± 1.1^{b}	2.2 ± 0.9^{bc}	3.5 ± 1.8^{a}	P < 0.001
Ewe lamb	2.9 ± 1.1^{bc}	2.6 ± 0.8^{bcd}	2.3 ± 0.6^{d}	3.5 ± 1.9^{a}	2.4 ± 1.0^{cd}	3.6 ± 1.7^{a}	P < 0.001
Sheep	16.3 ± 3.9^{a}	12.5 ± 2.4^{c}	10.7 ± 2.4^{d}	15.1 ± 5.0^{b}	11.9 ± 3.1^{cd}	17.5 ± 6.0^{a}	P < 0.001
Goats	9.2 ± 2.5^{a}	2.8 ± 2.3^{e}	4.0 ± 2.3^{d}	7.9 ± 2.7^{b}	4.9 ± 2.3^{c}	8.0 ± 2.1^{b}	P < 0.001
Cattle	5.5 ± 3.7^{cde}	4.5 ± 2.1^{e}	4.5 ± 2 .3^{e}	6.4 ± 2.2^{bc}	6.1 ± 1.5^{bcd}	7.0 ± 2.2^{b}	P < 0.001
Chicken	12.8 ± 4.6^{a}	10.5 ± 2.5^{b}	10.4 ± 3.1^{b}	8.4 ± 3.3^{c}	10.5 ± 2.6^{b}	10.3 ± 3.9^{b}	P < 0.001
Bee colony	0.9 ± 1.1^{d}	2.1 ± 1.2^{b}	3.1 ±1.7^{a}	1.4 ±1.1^{c}	1.9 ± 1.0^{b}	1.4 ± 0.9^{c}	P < 0.001
Donkey	1.1 ± 0.7^{bc}	1.0 ± 0.5^{c}	0.9 ± 0.5^{c}	1.5 ± 0.6^{a}	1.1 ± 0.7^{bc}	1.3 ± 0.7^{ab}	P < 0.001
Horse	0.0 ± 0.0^{d}	0.6 ± 0.7^{ab}	0.4 ± 0.6^{bc}	0.4 ± 0.5^{bc}	0.7 ± 0.7^{a}	0.3 ± 0.5^{c}	P < 0.001

There was a significant difference (P < 0.05) in average number of sheep, goat, cattle, chicken, bee colony, donkey and horse across the districts (Table 2).

Means with in a row with different superscripts differ (P < 0.05); ha = hectare; N = Number of respondents; SD = Standard deviation.

This variation in livestock holding is partly related to the average land holding which has a bearing on availability and size of grazing or browsing lands, crop residues and crop aftermath as the main feed sources of small holder livestock producers. The number of sheep per household reported in the present study is larger than the sheep flocks in the mixed crop livestock production system of the North highlands (Mengistie *et al.*, 2010).

Sheep Husbandry Practice

Husbandry practices have an implication for designing genetic improvement programs and introducing improved sheep management such as strategic health interventions at village level (Gizaw *et al.*, 2014). The flock herding practices of the smallholder farmers reflects the breeding managements and has an impact on the flock size.

Housing System and Herding Practice

According to the result, 64.4%, 29.6% and 6.0% of households are housing their sheep in closed, semi-closed and open housing type from spring season respectively (Table 3). Majority of sheep across all districts are housed in houses separated from family.

Table 3. Distribution of households according to their sheep housing systems and herd managements across six districts.

Variables	Respondents (%) by Districts						Overall N = 480
	Qadis N = 60	Abcamari N = 60	Muqur N = 60	Bala Murghab N = 60	Jawand N = 60	Qormach N = 60	
Closed	56.67	90.0	90	16.67	78.3	30.0	64.38
Open	5.00	-	-	3.33	-	20.0	29.58
Semi-closed	38.33	10.0	10	80.00	21.7	50.0	6.04
Herding practice during day time							
All in one	85.00	80.0	80.0	70.00	75.0	58.3	76.67

***Corresponding Author:** Abdul Momin AZIMI

Separate by age	-	-	-	18.33	-	21.7	5.21
Separate by species	15.00	20.0	20.0	11.67	25.0	20.0	18.13
Housing practice during night time							
All in one	35.00	33.3	35.0	58.33	36.7	50.0	45.21
Separate by age	26.67	25.0	16.7	20.00	30.0	21.7	21.04
Separate by species	38.33	41.7	48.3	21.67	33.3	28.3	33.75

N = Number of Respondents.

House termed locally as (barn) which is constructed from stone and locally available timber. All classes of the sheep were herded together during the day time though new born lambs were kept separately the first few days near the village and around the residence house of the owners. Higher percentage of respondents (80% to 85%), in Qadis, Abcamari, Bala Murghab, Muqur and Qormach keep their sheep in mixed herd along with cattle, goat and equines (Table 3). There is a mixing with other adjacent sheep flocks within a village immediately after crops are harvested (September to November) during communal grazing of crop aftermath. About 45.21%, 33.75% and 21.04% of the respondents keep their sheep during the night either together with other species or separate by species or separate by age group, respectively.

Feed Resources and Feeding Practice

The major feed sources for sheep in the six districts are summarized in Table 4. Natural pasture, crop residue, crop aftermath, hay and concentrate are the major feed sources in all the study areas. Among these feed resources, Natural pasture contributes the largest proportion followed by crop residue in all districts. The contribution of green grasses to feed farm animals is limited by the short duration of the rainfall. However, crop aftermath is replaced by grazing on common grazing land in those areas during the dry season. There was no improved forage introduced in all study sites. Sheep generally graze the whole day and taken to water sites (rivers, streams and watering place) once a day or three to four times a week.

Table 4. Feed resources of the study areas.

Feed Resources	**Ranks**			**Index**
	1st	**2nd**	**3rd**	
Natural Pasture	285	95	37	0.376
Crop residue	84	112	111	0.204
Crop aftermath	67	123	100	0.190
Hay	21	56	66	0.084
Concentrate	14	44	63	0.067
Brewery by products	5	17	26	0.026
Atella	4	23	58	0.040
Cactus	0	10	19	0.014

Dominated by Acacia species and other thorny plants are the predominant feed sources in Qadis, Abcamari, Jawand, Qormach and Bala Murghab districts, While Natural pasture lands and residues from cereal, wheat, and barley are the major feed sources in Abcamari and Qadis. The available feed has poor nutritive value and is less palatable during most of the year. Moreover, sheep and goat are left to graze and browse alongside with large animals that even worsen the feed shortage as animals need to compete with each other.

Common Sheep Diseases and Health Management

Based on the results of the interview, group discussion and observations made, sheep pox, External Parasites Foot and Mouth diseases, Anthrax, Foot rot and Respiratory diseases were the major diseases which affect sheep production in the study areas. Although vaccination was provided, it is limited to few common diseases. Limited animal health service delivery has been reported by sheep owners in all study areas (Table 5).

Sheep Production Constraints

The results indicate that feed and grazing land shortages, income, disease, water scarcity and loss of sheep by predators were the major constraints affecting sheep production (Table 6). Among these constraints feed shortage, income and diseases were top three constraints across the districts. Similar feed shortage is reported in different area (Behnke *et al.*, 1993). Feed shortage especially in the long dry season is critical problem in all study sites. This factor extremely affects the growth rate and body energy reserve of animals rendering them to have a low quality meat (Zelealem & Anal, 2014).

Proper feeding with high-energy diets increases the meat quality through increasing the muscle glycogen reserve, which helps to keep the pH low after rigor mortis, and improve intramuscular fat content (Sibut *et al.*, 2008). Therefore, proper feeding of animals for growth and meat quality should be practiced carefully.

Table 5. Scientific equivalents of the common sheep diseases in the study areas.

***Corresponding Author:** Abdul Momin AZIMI

Common sheep diseases		Frequency of diseases per districts (Respondents in percentage)						
Scientific name	**Localname (Tigrigna)**	**Qadis N = 60**	**Abcamari N = 60**	**Bala murghab N = 60**	**Muqur N = 60**	**Jawand N = 60**	**Qormach N = 60**	**Over all N = 480**
Anthrax	Megerem	3.33	5.0	5.0	5.0	5.0	6.67	4.79
Coenuruses	Zartie	3.33	20.0	13.33	5.0	20.0	6.67	12.50
Ticks	Kuridid	26.67	23.33	31.67	30.0	18.33	25.0	25.21
Internal Parasite	Efeal	16.67	20.0	16.67	11.67	23.33	13.33	16.46
Foot and Mouth	Eichlam	16.67	6.67	8.33	20.0	6.67	16.67	12.70
Foot rot	Mojelle	26.67	11.67	10.0	20.0	8.33	23.33	16.67
Pasteurelossis	Mi'eat	3.33	8.33	11.67	5.0	13.33	5.0	7.71
Small pox	Enfrir	3.33	5.00	3.33	3.33	5.0	3.33	3.96

N = Number of respondents.

Table 6. Ranked sheep production constraints in the study areas.

Constraints	**Ranks**			**Index**
	1st	**2nd**	**3rd**	
Feed shortage	155	98	59	0.25
Income	103	108	166	0.24
Shortage of grazing land	85	124	73	0.2
Diseases	87	103	116	0.2
water scarcity	27	19	41	0.06
Predators	23	28	25	0.05

Sheep Production Objectives

Table 7 shows the purpose of keeping sheep and their respective rank for the study area. Better understanding of the purposes of keeping sheep is a prerequisite for defining breeding goals (Jaitner *et al.*, 2001). Primary reason for keeping sheep in all study areas was income generation. Other reasons mentioned by farmers according to order of their respective indices were breeding purpose (stock replacement), home meat consumption, social security, holiday ceremony and manure.

Group discussion revealed that sheep rearing for income generation and household meat consumption were common and contribute to livelihood in the study areas, especially as alternative income sources to the poor. Given the breadth of purposes that farmers have for keeping sheep, much care is required in the choice of breeding objectives and breeding strategies as the function of the animals is closely linked to the traits desired by the producers (Jimmy *et al.*, 2010). Knowledge of reasons for keeping animals is a prerequisite for deriving operational breeding goals (Jaitner *et al.*, 2001).

Table 7. Sheep production objectives in the study areas.

Production objectives	**Ranks**			**Index**
	Rank 1	**Rank 2**	**Rank 3**	
Income	188	98	50	0.281
Breeding	104	159	67	0.242
Meat for home consumption	67	86	148	0.181
Manure	29	27	48	0.066
Social Security	58	86	109	0.158
Holiday day ceremony	34	26	58	0.074

Sheep Breeding Practice and Selection Criteria

In the study areas, mating was random. There was no report of controlled mating system across the study areas. Rams run together with ewe throughout the year and castration was an uncommon practice, which leads to indiscriminate and uncontrolled breeding. Farmers who had no breeding males, purchase ram from local markets or got ram service from their neighbors. This finding is in line with previous findings (Ndamukong and et all, 1998).

Selection criteria for ram and ewe with corresponding index values are presented in Table 8. The respondents prioritized body size, growth rate and adaptability as selection criteria for ram with the indices of 0.38, 0.26 and 0.14, respectively. The most important

***Corresponding Author:** Abdul Momin AZIMI

selection criteria for ewe were twining ability (index = 0.298), body size (index = 0.258) and lamb growth ability (index = 0.2). Others like mothering ability, color, lambing interval and age at first sexual maturity were also reported as criteria but with lower rankings. This finding is comparable to that noted earlier (Tesfaye and et all, 2010). Small holder farmers in all study districts indicated that they are mostly interested in getting more money when they sell live animals. The farmers wanted animals that grow fast, with higher mature weight, and preferably with high twinning rate with expectation to sell more animals per year.

Reproductive Performances

The results on reproductive performance are presented in Table 9. Good reproductive performance is a prerequisite for any successful livestock production program. Previous study suggested that differences exist in reproductive performance among indigenous sheep breeds and their variation allow for the selection of suitable breeds for a given environment (Mukasa *et al.*, 1995).

Age at First Mating (Sexual Maturity)

As indicated in 8, there is statistically significant difference ($p < 0.05$) of age at first mating (sexually maturity) for both sexes across the study sites.

Table 8. Selection criteria for ram and ewe in the study areas as ranked by owners.

Class and selection criteria's	Ranks			Index
	1st	2nd	3rd	
Ram				
Body size (appearance)	238	139	112	0.383
Growth rate	98	193	77	0.263
Adaptability	52	51	154	0.143
Age	16	12	24	0.033
Horn condition	26	27	39	0.059
Color	45	46	57	0.099
Libido	5	12	17	0.019
Over all	480	480	480	1.000
Ewe				
Body size (Appearance)	143	115	83	0.258
Twining ability	152	150	103	0.298
Lambing Interval	26	22	9	0.045
Mothering ability	22	24	31	0.050
Lamb growth	77	103	135	0.200
Age at first sexual maturity	28	32	65	0.074
Color	32	34	54	0.076
Overall	480	480	480	1.00

The average reproductive life of the ewes in the study sites showed significant difference ($P < 0.05$) among districts (Table 8). Among the six study districts longer ewe life span (11.0 ± 0.13 years) was recorded for Bala Murghab sheep. Similar length of ewe life time span was noted for Abcamari (Zewudu, 2008). Shorter life span of ewe (7.6 ± 0.15 years) was found for sheep in Muqur district which is comparable to value reported (Weldeyesus *et al.*, 2016). Selling of ewes is not a common practice and ewes are rather reared for breeding purposes. But, males are sold at early age particularly during the holy days and festivals.

Sheep Acquiring and Disposal Methods

The commonest methods used to acquire sheep were birth on the farm, buying and gift in the order of listed (Table 9). Farmers across the study sites sell their animals when they face financial problems; primarily in the nearby markets where local traders are principally actors in the marketing process. The study results also indicated that higher numbers of sheep are sold and better price is fetched during holidays, although farmers sell sheep at any time of the year depending on their need for money. Sheep owners sold their sheep primarily to.

Table 9. Ways of acquiring and disposing sheep in the study areas as ranked by owners.

Way of acquiring and disposing sheep	Ranks			Index
	Rank 1	Rank 2	Rank 3	
Way of sheep acquiring				
Birth	307	173	145	0.490
Bought	155	277	214	0.428
Gift	18	30	121	0.082
Way of Disposing				
Sale	231	127	59	0.349
Slaughter	111	182	117	0.283
Death	98	103	215	0.2483

***Corresponding Author:** Abdul Momin AZIMI

Predators	40	68	89	0.120

Purchase food items, cover health, farm input (fertilizer and cropland rent), labor (herdsman and laborers) and school expenses for children and to pay back credit. Sheep marketing in the study areas were traditional type. All of the respondents reported that weighing balance is unknown for selling and/or buying animals; rather visual assessment was used to estimate body weight and condition of the animals and set a price. Hence, selling price was fixed by negotiation between sellers and buyers. This result is in agreement with many research reports (Ayele *et al.*, 2003). Generally, smallholder farmers dispose their sheep mainly through sale and slaughter for home use.

CONCLUSION

Sheep in the study area were principally bred as source of income, meat for home consumption, manure, cultural and ceremonial purposes. Body size, growth rate, adaptability and twining abilities were important functional traits for sheep selection in all study sites. The practice of uncontrolled mating may result into inbreeding; however, the mixing of flocks during communal grazing, or in the neighborhood during day time helps to reduce risk of inbreeding. The sheep are kept under traditional production system which is constrained by, shortage of feed and grazing land, diseases, water scarcity, frequent drought, predators, and poor veterinary service. The level of productivity is low and less attention is given to husbandry and breed improvement. In order to raise productivity, it is important to involve farmers and other stockholders in designing breed improvement interventions, considering the existing breeding practices, management systems and trait preferences of the community and the multipurpose roles of sheep.

REFERENCES

1. Ayele, S., Assegid, W., Jabbar, M. A., Ahmed, M. M., & Belachew, H. (2003). Livestock marketing in Ethiopia: A review of structure, performance and development initiatives. *Socio-economics and policy research Working Paper*, *52*, 35.
2. Abebe, M. (1999) Husbandry Practice and Productivity of Sheep in Central Ethiopia. M.Sc (Thesis). *Alemaya University of Agriculture*.
3. Abegaz, S., Hegde, B. P., & Taye, M. (2011). Growth and physical body characteristics of Gumuz sheep under traditional management systems in Amhara Regional State, Ethiopia. *Livestock Research for Rural Development*, *23*(5), 11.
4. Central Statistics Agency (2017) Agricultural Sample Survey 2016/17. Volume II Report on Livestock and Livestock Characteristics (Private Peasant Holdings), Central Statistical Agency, Addis Ababa, 188 p.
5. Edea, Z., Haile, A., Tibbo, M., Sharma, A. K., Sölkner, J., & Wurzinger, M. (2012). Sheep production systems and breeding practices of smallholders in western and south-western Ethiopia: Implications for designing community-based breeding strategies. *Livestock Research for Rural Development*, *24*(7), 2012.
6. Tagel, G., & Anne, V. D. V. (2013). Assessing the evidence of climate variability in the northern part of Ethiopia. *Journal of development and agricultural economics*, *5*(3), 104-119.
7. Gizaw, S., van Arendonk, J. A., Valle-Zárate, A., Haile, A., Rischkowsky, B., Dessie, T., & Mwai, A. O. (2014). Breeding programmes for smallholder sheep farming systems: II. Optimization of cooperative village breeding schemes. *Journal of Animal Breeding and Genetics*, *131*(5), 350-357.
8. Jaitner, J., Sowe, J., Secka-Njie, E., & Dempfle, L. (2001). Ownership pattern and management practices of small ruminants in The Gambia—implications for a breeding programme. *Small ruminant research*, *40*(2), 101-108.
9. Jimmy, S., David, M., Donald, K. R., & Dennis, M. (2010). Smallholder goat breeding systems in humid, sub-humid and semi arid agro-ecological zones of Uganda. *Global Veterinaria*, *4*(3), 283-291.
10. Kosgey, I. S., Rowlands, G. J., van Arendonk, J. A., & Baker, R. L. (2008). Small ruminant production in smallholder and pastoral/extensive farming systems in Kenya. *Small Ruminant Research*, *77*(1), 11-24.
11. Mengistie, T., Girma, A., Solomon, G., Sisay, L., Abebe, M., & Markos, T. (2010). Traditional management systems and linear body measurements of Washera sheep in the western highlands of the Amhara National Regional State, Ethiopia. *Livestock research for rural development*, *22*(9), 2010.
12. Rekik, M., Haile, A., Mekuriaw, Z., Abiebie, A., Rischkowsky, B. A., & Salem, I. B. (2015). Review of the reproductive performances of sheep breeds in Ethiopia: Documenting existing knowledge and identifying priority research needs. *ICARDA Working Paper*.
13. Ndamukong, K. J. N., Sewell, M. M. H., & Asanji, M. F. (1989). Management and productivity of small ruminants in the North West Province of Cameroon. *Tropical Animal Health and Production*, *21*(2), 109-119.
14. SAS (Statistical Analysis System). (2008). *SAS/STAT Guide to Personal Computers* (9th Ed.). Prentice Hall, London.
15. Sibut, V., Le Bihan-Duval, E., Tesseraud, S., Godet, E., Bordeau, T., Cailleau-Audouin, E., ... & Berri, C. (2008). Adenosine monophosphate-activated protein kinase involved in variations of muscle glycogen and breast meat quality between lean and fat chickens. *Journal of Animal Science*, *86*(11), 2888-2896.

***Corresponding Author:** Abdul Momin AZIMI

16. Getachew, T., Haile, A., Tibbo, M., Sharma, A. K., Sölkner, J., & Wurzinger, M. (2010). Herd management and breeding practices of sheep owners in a mixed crop-livestock and a pastoral system of Ethiopia. *African Journal of Agricultural Research*, *5*(8), 685-691.
17. Gebreyohens, W., Tesfay, Z., & Tesfay, Y. (2016). Management and breeding objectives of indigenous smallholder highland sheep in northern Ethiopia. *Management*, *6*(1).
18. Gebretsadik, Z. T., & Anal, A. K. (2014). Indigenous sheep breeds of North Ethiopia: characterization of their phenotype and major production system. *Tropical Animal health and production*, *46*(2), 341-347.
19. Edea, Z. (2008). *Characterization of Bonga and Horro indigenous sheep breeds of smallholders for designing community based breeding strategies in Ethiopia* (Doctoral Dissertation, Haramaya University).

***Corresponding Author:** Abdul Momin AZIMI